PROGRAM facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Strategic Center for Natural Gas and Oil

06/2005

OIL EXPLORATION & PRODUCTION PROGRAM APPLIED TECHNOLOGIES

Background

America is not running out of oil and natural gas. About two thirds of the original-oilin-place (OOIP) in the U.S. remains in the ground—more than 400 billion barrels. But the Nation's oil and gas resources are becoming more difficult to find and produce. And these resources are being produced increasingly by smaller, independent companies that may not have the resources to apply new or unfamiliar technologies to their properties.

A key element of DOE's oil and gas research program is to help provide America's oil and gas producers with the financial incentives to take innovative exploration and production concepts out of the laboratory and into oil or gas fields that are experiencing production problems.

The Applied Technologies Program applies new technologies or existing technologies in new ways in an oil field setting. The key initiatives under the Applied Technologies Program are Technology Development with Independents, the Native American Program, PUMP, and the Reservoir Class Field Demonstration Program.

Technology Development with Independents

Independent producers drill 85% of the wells in the U.S. and produce more than 40% of the nation's crude oil. This program partners with independent operators producing from domestic fields to apply untried or unfamiliar technological approaches to boost production. The program's goals are to:

- Extend economic production of domestic fields by slowing the rate of well abandonments and preserving industry infrastructure.
- Increase ultimate recovery in known fields using advanced technologies to evaluate formations, oil recovery, and production technologies.
- Use field demonstrations to stimulate information exchange and technology application among stakeholders through participation in DOE projects.

Native American Program

Native American reservations contain large reserves of oil and gas. On tribal lands, there are an estimated 890 million barrels of oil and natural gas liquids and 5.6 trillion cubic feet of gas. This translates into huge potential revenues for the tribes, even when conservative production estimates are used.

DOE's Native American Initiative Program was designed to help tribes develop and manage their energy resources in an environmentally sound manner by participating in joint exploration and production efforts with the oil industry.

CONTACTS

Margaret Lou
Director
Office of Petroleum
One West Third Street
Suite 1400
Tulsa, OK 74103-3519
918-699-2015
margaret.lou@netl.doe.gov

Jerry Casteel
Director
Petroleum Technology
Management Division
One West Third Street
Suite 1400
Tulsa, OK 74103-3519
918-699-2042
jerry.casteel@netl.doe.gov

CUSTOMER SERVICE

1-800-553-7681

Information about our programs can be found at:

www.netl.doe.gov

The Native American program identifies unique resources and experiences of individual tribes and responds to their needs through talks with tribal leaders and the Bureau of Indian Affairs. Technology R&D projects designed to address these needs are undertaken in partnership with the tribes. The program encourages dialogue among tribes and other stakeholders through meetings and technology-transfer workshops

Preferred Upstream Management Practices

The PUMP (Preferred Upstream Management Practices) program combines petroleum industry technology "best practices" and an active campaign of disseminating those practices and technologies to domestic oil producers. The PUMP Program reduces barriers to domestic production and address specific issues to maximize return on investment. The focus is very near-term with a regional emphasis. It collected and distributed information that domestic producers can use to keep oil flowing in America's oil fields.

PUMP employs four strategies to rapidly impact production: 1) focus on regions that present the biggest potential for additional oil production; 2) integrate solutions to technological, regulatory, and data constraints; 3) demonstrate validity of these solutions through targeted field demonstrations and comprehensive documentation of successful use; and 4) establish technology transfer methods and organizations to provide access to information.

Reservoir Class Oil Field Demonstration Program

Realizing that U.S. oil production was declining rapidly and that huge volumes of oil were being abandoned in domestic reservoirs because continued production was uneconomic, DOE initiated the Reservoir Class Oil Field Demonstration Program in 1992. To determine which of the more than 96,000 oil reservoirs in the U.S. should receive priority attention, DOE first grouped 2,500 of the largest domestic reservoirs into geologically similar reservoir classes representing 65 percent of the OOIP in the Lower 48 states. The reservoir classes were then prioritized by the amount of producible oil remaining in them and the likelihood of premature abandonment:

Class I Fluvial-Dominated Deltaic Reservoirs. These reservoirs were formed in ancient river deltas and originally contained about 70 billion barrels of crude oil. Class I reservoirs now contain over 5 billion barrels of potentially recoverable oil, half of which is at risk of abandonment by 2010.

Class II Shallow Shelf Carbonate Reservoirs. Formed in shallow ocean waters, these reservoirs originally contained more than 68 billion barrels of crude oil. Most of the remaining 48 billion barrels are at risk of being abandoned. Advanced technologies have the potential to recover an additional 5 billion barrels.

Class III Slope and Basin Clastic Reservoirs. Created from sediment deposited in deep ocean slope and basin areas, these reservoirs are estimated to have originally contained nearly 60 billion barrels of light and heavy crude oil. Most of the remaining 44 billion barrels are in danger of being abandoned unless more sophisticated techniques are widely deployed. Advanced technologies could recover another 5 billion barrels.

Benefits

The Technology Development With Independents Program was begun in 1995 as a series of competitions. By 2003, these competitions had resulted in 62 projects having been conducted in 19 states. Largely because of this program, many marginal U.S. oil fields that were on the verge of being abandoned are still in production today.

The Native American Program has spawned a renewed interest in tribal lands as potential opportunities for exploration and production investment. Companies currently are negotiating leases with the Three Affiliated Tribes on Fort Berthold Reservation in the Williston Basin of North Dakota. In May 2005 the Crow Tribe in Montana signed an oil and gas exploration lease with a small Wyoming independent company that is likely to begin drilling this year. Both opportunities resulted from DOE projects.

The PUMP Program, implemented in 2001 to slow the decline in U.S. oil production, has been instrumental in reducing the number of marginal domestic oil fields being abandoned and shut down because of operational, economic, regulatory, or other factors.

Projects selected in the initial Reservoir Class Demonstration Program were expected to have generated about 500 million barrels of oil. Several Class I projects and one Class III project have individually produced tax revenues and royalities that exceeded the Federal Government's investment in the entire program. Successes from completed Class projects include innovative waterfloods, CO2 and steamflood projects, and new developments in the use of seismic attributes for 3-D and 4-D seismic interpretation.